

**ARIZONA GAME AND FISH DEPARTMENT
HABITAT PARTNERSHIP PROGRAM
HABITAT ENHANCEMENT AND WILDLIFE MANAGEMENT PROPOSAL**

PROJECT INFORMATION

Project Title: *CLIFFROSE BROWSE RESTORATION AT MT ELDEN*

Project No.

Region/GMU: *Region II/ GMU 11M*

HPC: *Flagstaff - Williams*

Project Type: *Cliffrose browse restoration, greenhouse production, fencing, re-seeding, prescribed burn, ponderosa pine hand thinning*

Project Description: *Enhance cliffrose (*Purshia stansburiana*) browse for urban mule deer on important wintering grounds at the base of Mt Elden, San Francisco Peaks, Flagstaff. Restart natural regeneration for a decadent and imperiled cliffrose population by creating 10, 1-acre, fenced enhancement plots that vary by experimental application of broadcast burning, cliffrose seed germination, and cliffrose root stock transplanting. Ponderosa pine will be hand thinned on all 10 plots to reduce competition for cliffrose germination and transplants. This work is part of a landscape scale, US Forest Service Eastside Fuels Reduction and Forest Health Project on approximately 20,000 acres of the Peaks Ranger District, Coconino National Forest, developed in collaboration with the Greater Flagstaff Forest Partnership. To see the large plan in its entirety, and see specific reference to this project on pages 33, 65, 108, and 162 of the EA, at <http://www.fs.fed.us/r3/coconino/nepa/index.shtml#07jan08>. Lessons learned from this project will inform and shape larger-scale cliffrose browse management within the Eastside Project boundary (particularly near Walnut Canyon) and elsewhere on the Coconino National Forest. This project will be implemented by the US Forest Service (cash labor match, in-kind administrative match, fence material donation), the Arboretum at Flagstaff (seed collection, re-seeding, greenhouse production, monitoring), the Arizona Game and Fish Department (in-kind oversight, cash labor and monitoring match), and the Greater Flagstaff Forest Partnership (volunteer coordination, information and education administration, project oversight, and volunteer labor match).*

Wildlife Species to Benefit: *Mule deer (*Odocoileus hemionus*) will benefit from this project. Cliffrose is an important browse species for mule deer because it has high nutritional value and it offers succulent forage year round. This becomes particularly important during the winter months when other mule deer forage species are dormant or covered in snow. High densities of cliffrose shrubs can also provide thermal protection for wintering mule deer. The project area lies along the wildland-urban interface where high quality mule deer habitat is often limited. The mule deer that currently use the project area are part of a highly-valued herd for local hunting opportunities, Watchable Wildlife, and ecological food web sustainability.*

Possible Funding Partners:

Implementation Schedule:

Beginning: *April 2007*

Completed: *April 2010*

PROJECT FUNDING

SBG Funds Requested: \$45,701.40
(2007 = \$1,080.00; 2008 = \$28,122.30; 2009 = \$14,312.30; 2010 = \$2,186.80)

Cost Share Funds: \$41,978.88
(CNF = \$11,715; VOLUNTEERS = \$9742.08; AZGFD= \$11,807.28; ARBORETUM = \$7,512.00)

Total Project Costs: \$87,680.28

PARTICIPANT INFORMATION

Applicant: Sarah Lantz
Telephone: 928-214-1253, slantz@azgfd.gov

Address: Arizona Game and Fish – Region II
3500 S. Lake Mary Road
Flagstaff, AZ 86001

AGFD Contact and Phone No.
(If applicant is not AGFD personnel)

Coordinated with: US Forest Service, Coconino NF, Peaks and
Mormon Lake Ranger District
Greater Flagstaff Forest Partnership
The Arboretum at Flagstaff

Date: January 2006 - present

Applicant's signature:

Date:

NEED STATEMENT/PROBLEM ANALYSIS:

In collaboration with the Greater Flagstaff Forest Partnership, the Coconino National Forest (CNF) is planning to thin and burn approximately 20,000 acres of ponderosa pine forest in the Eastside Fuels Reduction and Forest Health Project on the wildland-urban interface of Flagstaff. Contained within the Eastside planning area are several hundred acres of cliffrose, the majority of which occur along the base of Mt. Elden and along Walnut Canyon. Cliffrose at the base of Mt. Elden has historically provided an important nutritional and thermal habitat benefit for a highly-valued, wintering urban mule deer herd.

Competition from the ponderosa pine overstory, increased needle litter depth, and heavy browse utilization have led to decadent, tree-like growth forms of cliffrose, where new leader growth is becoming inaccessible to mule deer, and cliffrose seedling recruitment has largely halted. Research indicates that decadent cliffrose is highly susceptible to mortality when burned; therefore it is likely that the CNF burning treatments could kill and eliminate the few remaining cliffrose shrubs in the Mt. Elden base area. Management actions are needed to protect existing, mature cliffrose from fire mortality. Furthermore, the limited research that is available indicates that young cliffrose may be fire resistant, with some evidence of re-sprouting and increased seed germination in areas where the fire has removed heavy needle duff. Management actions are then also needed to catalyze cliffrose seed germination and seedling recruitment in the project area; such that future prescribed burning activities will not cause large-scale mortality of cliffrose, and cliffrose can be sustained despite restoration of a more frequent fire regime. In general, however, there is very little information available on how managers can encourage cliffrose to regenerate after prescribed fire or forest thinning.

Wildlife browse is a limited and declining resource across Northern Arizona. However, little information is available to help managers be successful with browse restoration. With the Eastside Project, we have an opportunity to enhance cliffrose browse and also test, monitor, and learn which browse restoration methods are most effective in the planning area. What we learn within this project will inform

the CNF Best Management Practices for thinning and burning treatments in other cliffrose stands (primarily along Walnut Canyon and Timberline) within the Eastside Project planning area, as well as other landscape-scale wildlife habitat restoration projects elsewhere in Northern Arizona.

PROJECT OBJECTIVES:

- 1) Establish cliffrose enhancement plots within the CNF Eastside Project planning area, focusing on the mule deer wintering grounds near the base of Mt. Elden.*
- 2) Prevent cliffrose mortality due to prescribed fire within the enhancement plots.*
- 3) Collect cliffrose seed, properly store, and germinate via greenhouse production for root-stock transplanting.*
- 4) Thin ponderosa pine and broadcast burn within enhancement plots.*
- 5) Determine effective cliffrose restoration methods (e.g., seeding vs. root-stock or seedling outplanting, broadcast burning vs. no burning) within the enhancement plots.*
- 6) Educate volunteers, Flagstaff Public Schools, and the general public on the importance of mule deer habitat conservation and how habitat restoration can enhance wildlife-based recreation.*
- 7) Inform larger-scale fuels treatments where cliffrose occurs within the Eastside Project planning area and elsewhere on the CNF.*

PROJECT STRATEGIES:

- 1) Establish cliffrose enhancement plots within the Forest Service Eastside Project planning area, focusing on the mule deer wintering grounds near the base of Mt. Elden.*

CNF has already performed NEPA within the project area per the Eastside Project Environmental Assessment. In 2006, the CNF Peaks and Mormon Lake Ranger District wildlife crew surveyed and mapped cliffrose in the Mt. Elden base area. Based on this existing information, we will select 10, 1-acre enhancement plots standardized by soil type and similar microclimate. Enhancement plots will be fenced in groups of 5 (5 broadcast burn plots, 5 unburned). Fencing will prevent herbivory on young, establishing seedlings for the duration of the project. Fences will be removed after project completion, once seedlings are established and natural recruitment has been restored. Within the 2, 5-acre fenced areas, plots will be further subdivided by treatment type: laying several old cliffrose plants on their side, burial seeding, broadcast seeding, root-stock planting, or combinations thereof. CNF, AZGFD, and Arboretum will work together to select appropriate sites. Fences will be constructed by CNF recreation and range field crews.*

** This satisfies the Environmental Analysis Checklist requirements for AZGFD. See the CNF Eastside EA.*

- 2) Prevent cliffrose mortality due to prescribed fire within the enhancement plots.*

The Urban Wildlife Planner with the Flagstaff Regional Office of the Arizona Game and Fish Department (hereafter AZGFD) and volunteer laborers will rake needle duff away from individual cliffrose plants within 9 of the 10 enhancement plots. We will retain the needle layer within 1 of the enhancement plots to measure cliffrose mortality in the absence of raking.

- 3) Collect cliffrose seed, properly store, and germinate via greenhouse production for root-stock transplanting.*

Thirty pounds of cliffrose will be professionally collected from local sources, properly cleaned, and temporarily stored under climate controlled conditions until needed for direct seeding or for greenhouse germination. Greenhouse production will be conducted by a Research Botanist at the Arboretum at Flagstaff. Propagules will be germinated and grown to sufficient age for seedling outplanting back onto the project site.

4) Thin ponderosa pine and broadcast burn within enhancement plots.

The CNF Silviculturalist from the Peaks and Mormon Lake Ranger District will develop a forest prescription to hand thin ponderosa pine up to 9 inches within the enhancement plots, and will oversee tree thinning by sawyers from the CNF fire suppression field crew. Thinned trees will be piled. The CNF Fuels Management Officer will plan and oversee pile burning and broadcast burning within the enhancement plots, and labor will be performed by the CNF fire suppression field crew.

5) Determine effective cliffrose restoration methods (e.g., seeding vs. root-stock planting, broadcast burning vs. no burning) within the enhancement plots.

Seeding and root-stock transplanting will be done by the Research Botanist from the Arboretum, with assistance from AZGFD and trained volunteer laborers. Seeds can be sown in enhancement plots the following growing season after collection and appropriate pre-seeding treatments. Greenhouse propagules will need 1-1.5 years of growth prior to transplant, and all greenhouse production activities will be performed by the Arboretum Research Botanist with assistance from Flagstaff Public School Children. Once plots are seeded and/or transplanted, they will be monitored at a minimum of bi-monthly during the growing season for the duration of the project. Plots will be monitored for seed establishment as well as seedling survival, and monitoring will be performed by the Research Botanist, AZGFD, and trained volunteers.

6) Educate volunteers, Flagstaff Public Schools, and the general public on the importance of mule deer habitat conservation and how habitat restoration can enhance wildlife-based recreation.

Prior to assisting project personnel with raking, seeding, transplanting, and monitoring, volunteers will receive orientation to the project objectives and will be trained to perform project methods. These citizen scientists will learn the value of restoring mule deer habitat and the intricacies of habitat enhancement projects. Flagstaff Public School children, largely high-school age, will assist with project activities for which training is minimally required. Two interpretive signs will be constructed near public access sites (trails and/or trailheads) closest to the project area. Interpretive signs will explain the purpose and goals of the mule deer habitat enhancement project, highlight the importance of wildlife habitat conservation on the urban interface, and provide some Watchable Wildlife tips for viewing mule deer and other wildlife in the Mt Elden area. Volunteer coordination and information/education activities will be a combined effort between AZGFD and the Greater Flagstaff Forest Partnership.

7) Inform larger-scale fuels treatments where cliffrose occurs within the Eastside Project planning area and elsewhere on the Coconino National Forest.

The Arboretum Research Botanist, with assistance from AZGFD, will synthesize monitoring data and create technical reports for CNF detailing successful cliffrose regeneration methods in the project area. Annual progress reports will be synthesized into a final technical report and made available at project completion. The Best Management Practices identified in this report will then be available for CNF's consideration and potential implementation on a larger scale within the Eastside Project planning area where cliffrose is also known to occur. These areas are primarily north of the project area near Timberline, and in the southern part of the Eastside Project planning area along the north rim of Walnut Canyon. The management recommendations in the technical report will also be available for future mule deer browse enhancement projects elsewhere in CNF and potentially throughout Northern Arizona.

We will integrate Arizona Game and Fish Department Comprehensive Wildlife Conservation Strategy (CWCS) priorities into the Eastside Project by preventing loss and degradation of sensitive montane conifer habitat, identifying forest harvesting and burning strategies that promote wildlife habitat diversity, promoting restoration of natural fire regimes for improving forest health, conserving sensitive understory habitat for wildlife, and educating the public on the importance of wide-ranging species such as mule deer

for ecosystem health (Arizona CWCS, Table 4, version 08.March.2006).

PROJECT LOCATION: See attached map.

LAND OWNERSHIP AT PROJECT SITE: US Forest Service, Coconino National Forest

IF PRIVATE PROPERTY...? Not applicable.

HABITAT DESCRIPTION:

Montane conifer forest characterized by ponderosa pine and Gambel oak, at an elevation range 7400-8600 feet. Thin bands of cliffrose extend from the rocky foothills of Mt. Elden down into the deeper soils of Elden Pueblo, the Mt. Elden Environmental Study Area, and into the Sandy Seep area. Much of this forest has been logged for timber, especially in the last century. In spite of changes in the historic fire regime, an open, park-like forest structure and variable, patchy tree distribution still exists in some areas due primarily to lower moisture and variable soil conditions. In areas where a closed canopy stand structure occurs, there is a decreased understory (herbaceous and cliffrose) productivity and diversity, increased inter-tree competition, decreased tree growth and vigor, increased susceptibility to insects and disease, increased fuel continuity, increased crown fire potential, an increased fire size and intensity. Understory is primarily composed of cliffrose, blue grama (*Bouteloua gracilis*), Arizona fescue (*Festuca arizonica*), and western wheatgrass (*Pascopyrum smithii*). Large oaks occur throughout the project area. There are 2 wildlife waters within 1 mile of the project area, but it is unknown if these catchments hold perennial water.

ITEMIZED USE OF FUNDS:

Annual Costs by SBG Funds Requested and by Breakdown of Cash vs. In-kind Matching Funds.

	<u>TOTAL COSTS</u>	<u>SBG FUNDS</u>	<u>MATCH FUNDS</u>	<u>CASH MATCH</u>	<u>IN-KIND MATCH</u>
2007	8441.2	1080	7361.2	3000	4361.2
2008	43792.94	28122.30	15670.64	9149.6	6521.04
2009	27298.34	14312.3	12986.04	8370	4616.04
2010	8147.8	2186.8	5961	1344.96	4616.04
TOTAL COST	\$87, 680.28	\$45,701.40	\$41, 978.88	\$21, 864.56	\$20, 114.32

Matching Fund Source

<u>MATCH SOURCE</u>	<u>AMOUNT</u>
FS	11715
VOLUNTEERS	9742.08
GFFP	1202.52
AZGFD	11807.28
ARBORETUM	7512
MATCH TOTAL	41,978.88

2007 Project Activities, Costs, and Funding Sources.

<u>BUDGET ITEM</u>	<u>COST</u>	<u>SOURCE</u>	<u>CASH MATCH</u>	<u>IN-KIND MATCH</u>
Silviculture Admin.	2650.00	USFS		X
Pine Thinning	3000.00	USFS	X	
Seed Collection	1080.00	SBG Funds		
AZGFD Admin.	1711.20	AZGFD		X

TOTAL	\$8,441.20			
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2008 Project Activities, Costs, and Funding Sources.

<u>BUDGET ITEM</u>	<u>COST</u>	<u>SOURCE</u>	<u>CASH MATCH</u>	<u>IN-KIND MATCH</u>
Fence Supplies	3660.00	3160.00 FS 500.00 SBG Funds	X	
Fence Construction	4680.00	SBG Funds		
FS Fire Mgmt Admin.	300.00	USFS		X
FS Wildlife Admin.	750.00	USFS		X
Archae. Clearance	855.00	USFS		X
Rake lining cliffrose	1537.44	VOLUNTEER AZGFD	X	X
Prescribed Burn	1000.00	USFS	X	
Research Botanist (Greenhouse production, seeding, monitoring)	12125.50	SBG Funds		
Propagation Supplies	5630.00	SBG Funds		
Seeding Assistance	2980.16	VOLUNTEER AZGFD	X	X
Interpretive Signs	3000.00	SBG Funds		
Volunteer Coord., I&E	2186.80	SBG Funds		
AZGFD Admin.	1711.20	AZGFD		X
Arboretum Admin.	2504.00	ARBORETUM		X
Mapping Services	400.84	GFFP		X
TOTAL	\$43,792.94			

2009 Project Activities, Costs, and Funding Sources.

<u>BUDGET ITEM</u>	<u>COST</u>	<u>SOURCE</u>	<u>CASH MATCH</u>	<u>IN-KIND MATCH</u>
Research Botanist (Greenhouse production, seeding, monitoring)	12125.50	SBG Funds		
Monitoring (AZGFD, Volunteers)	5379.84	VOLUNTEER AZGFD	X	X
Seeding Assistance	2980.16	VOLUNTEER AZGFD	X	X
Volunteer Coord., I&E	2186.80	SBG Funds		
AZGFD Admin.	1711.20	AZGFD		X
Arboretum Admin.	2504.00	ARBORETUM		X
Mapping Services	400.84	GFFP		X
TOTAL	\$27,298.34			

2010 Project Activities, Costs, and Funding Sources

<u>BUDGET ITEM</u>	<u>COST</u>	<u>SOURCE</u>	<u>CASH MATCH</u>	<u>IN-KIND MATCH</u>
Monitoring (AZGFD, Volunteers)	5379.84	VOLUNTEER AZGFD	X	X
Volunteer Coord., I&E	2186.80	SBG Funds		
AZGFD Admin.	1711.20	AZGFD		X
Arboretum Admin.	2504.00	ARBORETUM		X
Mapping Services	400.84	GFFP		X
TOTAL	\$8,147.80			

LIST COOPERATORS AND DESCRIBE POTENTIAL PARTICIPATION:

US Forest Service, Coconino National Forest, Peaks and Mormon Lake Ranger District

- *CNF is the landowner at the project site.*
- *CNF has also completed NEPA for the project site through the Eastside Fuels Reduction and Forest Health Environmental Assessment.*
- *CNF also conducted cliffrose surveys during the 2006 growing season and that information will be used for siting enhancement plots.*
- *Donation of \$3,160 of fence materials.*
- *Cash labor donation to thin, pile, pile-burn, and broadcast-burn.*
- *In-kind administrative labor donation for project oversight from Peaks and Mormon Lake Ranger District Wildlife Biologist, Fuels Management Officer, Forest Silviculturalist, and archaeological clearance.*
- *CNF will also serve as a contractor to construct enhancement plot fences.*

The Arboretum at Flagstaff

- *The Arboretum will donate 240 in-kind labor hours from their Research Scientist to oversee greenhouse production and other activities performed by the Research Botanist (contractor), and assist AZGFD with the write up of the technical report at project completion.*
- *The Arboretum will assist with volunteer coordination and provide outreach to Flagstaff Public Schools.*
- *The Arboretum will also be on contract for seed treatment, greenhouse production, transplant, and monitoring.*

Greater Flagstaff Forest Partnership

- *GFFP will donate \$1200 in-kind labor donation for GIS mapping services.*
- *Volunteer match will be coordinated by GFFP, in cooperation with the Arboretum and AZGFD.*
- *GFFP will also be on contract to coordinate Partnership volunteers and provide information/education opportunities for Flagstaff Public Schools and the general public.*

PROJECT MONITORING PLAN:

Monitoring is very important to this project. Monitoring will help identify the most successful and appropriate method for restoring cliffrose recruitment on other acres within the Eastside Project planning area, and elsewhere in Northern Arizona. The results of this monitoring plan will be synthesized in a technical report, with potential for peer-reviewed publication in a management journal with southwestern or national distribution. At a minimum, enhancement plots will be monitored bi-monthly. Monitoring will begin in the fall of 2008 after the first round of direct seeding, will continue through 2009 during root-stock transplanting and the second round of seeding, and will be completed in spring 2010. All 10 enhancement plots will be monitored by the Arboretum Research Botanist with assistance from AZGFD and trained volunteers using standardized data sheets. Plot monitoring data collection methods will be standardized, and monitors will be searching for cliffrose seed establishment and

documenting transplant survival. Most monitoring efforts will be restricted to the growing season when plots are not covered with snow. During these monitoring visits, enhancement plot fences will be checked for damage.

PROJECT MAINTENANCE:

Maintenance on this project will be minimal, and will be performed by contractors from the Arboretum and CNF. If fence maintenance is required, the need will be detected by the Arboretum Research Botanist through frequent site monitoring, and actual fence repair will be done by CNF range field crews. Plant maintenance will be performed by the Research Botanist. Greenhouse maintenance will also be performed by the Research Botanist with in-kind assistance from the Arboretum Research Scientist.

PROJECT COMPLETION REPORT TO BE FILED BY:

Sarah Lantz, Urban Wildlife Planner, Flagstaff Regional Office Habitat Program, Region II

WATER DEVELOPMENT PROJECTS (see attached worksheet):

Not applicable.

TREE SHEARING (AGRA-AXE, PUSH) PROJECTS (see attached worksheet):

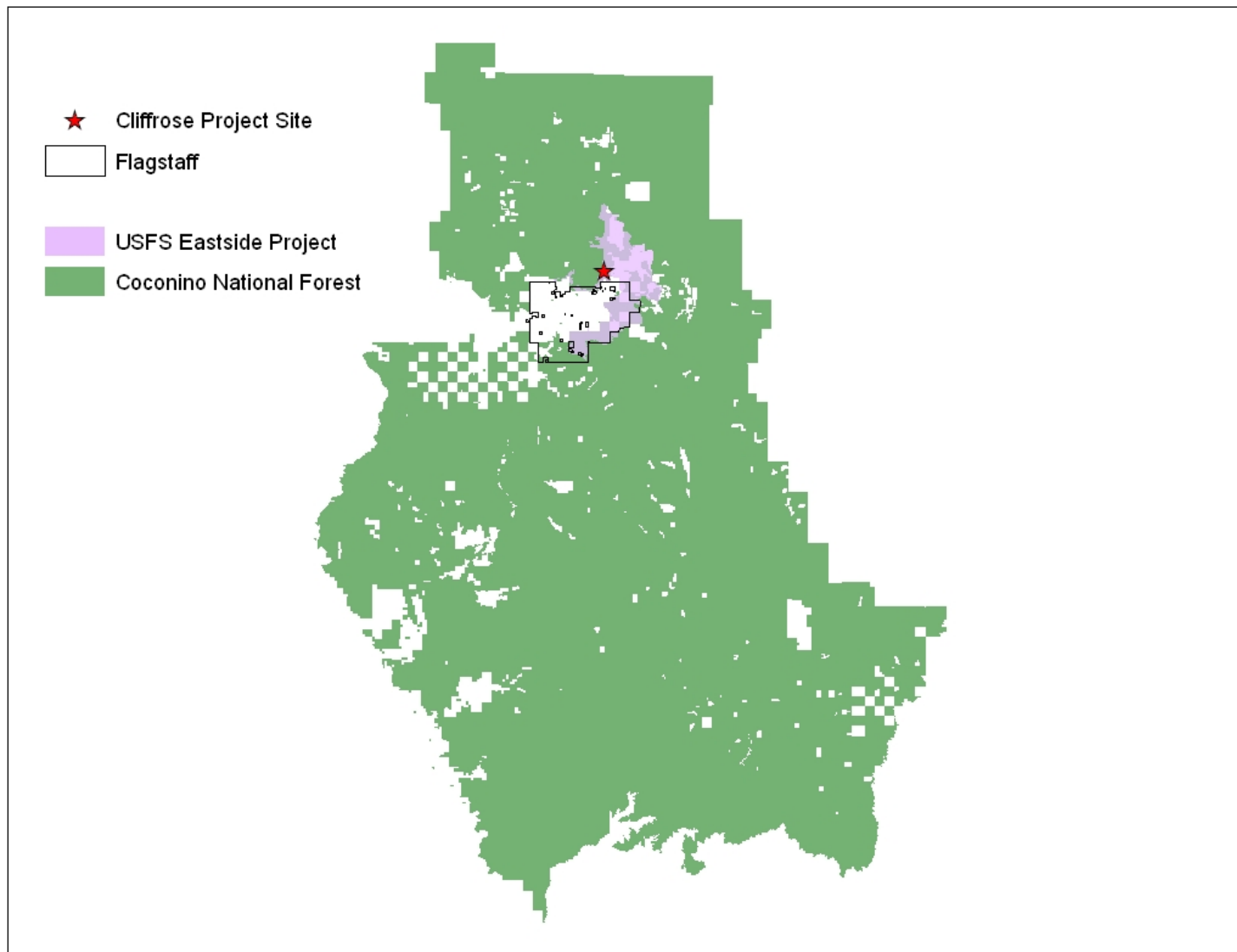
Not applicable.

PROJECT PHOTOS AND MAPS

Photo: Typical cliffrose stand from the project area, showing the high browse line and decadent condition.



Map: Project site location shown within the Eastside Fuels Reduction and Forest Health Plan area of the Coconino National Forest.



Map: HPC Proposed Project Area, showing the general area where cliffrose enhancement plots will be sited near the base of Mt. Elden.

